

**RHITHROGENA TAURISCA SP.N. - A NEW REPRESENTATIVE OF THE
RH. SEMICOLORATA - GROUP FROM AUSTRIA (INSECTA: EPHEMEROPTERA)**

E. BAUERNFEIND, Wien

A b s t r a c t : *Rhithrogena taurisca* sp.n. is described in adult and nymphal stages from the Karner Alm, Austria. Imagines are similar to *Rh. carpatoalpina*, but differ in details of penial structure and colouration. Differentiating characters for egg, nymph and imago are listed in tabular form. Egg chorion allows easy discrimination from the hitherto described species of the *Rh. semicolorata*-group.

Keywords: Taxonomy, Ephemeroptera, Heptageniidae, *Rhithrogena*, *Rh. semicolorata*-group.

Introduction

In material collected by the author during 1986 - 1990 from the Karner Alm, an alpine pasture in the Nock - Mountains (Salzburg), a new species of *Rhithrogena* EATON 1881 was found. In adult and nymphal stages *Rh. taurisca* sp.n. is similar to *Rh. carpatoalpina* and *Rh. puytoraci*, but shows distinctly different egg chorionic - structure. From the hitherto known European species of *Rhithrogena* EATON (without Caucasus area) the following can be included in the *Rh. semicolorata*-group sensu SOWA (1984): *Rh. semicolorata* (CURTIS 1834), *Rh. iridina* (KOLENATI 1859), *Rh. ferruginea* NAVAS 1905, *Rh. picteti* SOWA 1971, *Rh. dorieri* SOWA 1971, *Rh. colmarsensis* SOWA 1984, *Rh. herzegovina* TANASIJEVIĆ 1984, *Rh. carpatoalpina* KLONOWSKA et al. 1987, *Rh. puytoraci* SOWA & DEGRANGE 1987, and *Rh. taurisca* sp.n.

Rh.. eatoni ESBEN-PETERSEN 1912 has been transferred to the *Rh. insularis*-group (BELFIORE 1987), and *Rh. castellana* NAVAS 1927 obviously belongs to the *Rh. sowai*-group (THOMAS & SARTORI 1985). *Rh. ferruginea* NAVAS (nec sensu SOWA 1971 et auct. sequ.) is known only from the short original description (NAVAS 1905) and from THOMA's (1968) redescription of the type specimen (SOWA & DEGRANGE 1987). ZURWERRA et al. (1987) treated *Rh. iridina*, *Rh. picteti* and *Rh. ferruginea* (sensu SOWA 1971) as subspecies of nominate *Rh. semicolorata* and proposed a new scheme of species grouping in the genus, based on enzyme electrophoretic studies.

Conventional grouping in *Rhithrogena* depends on morphological features and is not understood as an expression of phylogeny, our knowledge of evolutional trends in the genus being very limited at present; nevertheless the application of morphological groups is of practical importance, especially for species identification. Following the intentions of SOWA (1984), characteristics of the *Rh. semicolorata*-group are: Imagines are of medium size, their pleurae without distinct maculation, forewings more or less coloured, veins (C, Sc, R lighter, penis lobes rounded with outer apical tooth large, titillator with teeth and relatively broad. In nymphs the sclerit of the first abdominal sternit is quadrangular, gill I crenulated at margin and with triangular or rounded plica, gills 2 - 7 with smooth margin (exceptionally with few incisions), and segments in the terminal half of tails on their surface with slightly squamous, shagreen - like sculpturing.

***Rhithrogena taurisca* sp.n.**

M a t e r i a l : Holotype ♀ nymph, in parts (including eggs) on microscopical slide.

Paratypes 2 ♂, 2 ♀, 2 nymphs, Klölingbach; Karner Alm, 1900 m a.s., county of Salzburg, Austria, 15.VIII.1990, leg. author. Types deposited in the collection of the Vienna Museum of Natural History.

Rest of material 24 ♂, 5 ♀, 20 nymphs (various dates) in the author's collection. A part of the imaginal material was captured in copula, association with nymphs was established by identity of egg chorion.

D e s c r i p t i o n : ♂ imago: Length of forewing 10 - 11,5 mm, general colouration of body pale, brown. Complex eyes touching, light violet, at the base with two dark bands, each with a light, cream - coloured

rim. Ocelli white with broad black base. Scapus dark brown, pedicellus and flagellum light amber. Thorax light brown, mesonotum very pale chestnut brown, pro- and metanotum darker. Pleurae without distinct maculation, light brown. Sterna dark brown. Forewings transparent with very light brown hue. Venation of wings dark brown, veins Sc and R in basal half yellowish brown. Pterostigma brownish with 13 - 15 crossveins, most of them single. Costal field brownish with distinct crossveins. Anal field enshrouded with dark grey at the utmost base. Hindwings almost transparent with dark venation, veins C, Sc lighter at base. Fore - femora dark olive brown, with distinct black, triangular spot, tibia and tarsus dark brown. Proportion femur: tibia: tarsus (1-5) = 9 : 15 : (1 : 7 : 6 : 5 : 2). Middle and hind femora light olive with black triangular spot, tibiae and tarsi darker, olive grey. Abdominal tergites uniformly brown, the colour of burnt umbra, with dense black tracheization. Anterior corners of tergites transparent. Abdominal sternites darker, greyish brown, unicolourous. Ganglionary chain not visible. Cerci dark brown. Genitalia: Forceps base light brown, forceps darker. Expansions on forceps base distinct, clearly bent downwards (fig.6). Penial lobes divergent. Seen from the ventral side (fig.1) the penis apex is rounded, the outer apical tooth sometimes indistinctly visible. Penial vesicles small. Titillators with three teeth. From dorsal side most of the apical surface of penislubes is visible, the inner apical tooth situated clearly subapical, the outer tooth large, slightly bent inwards (figs. 2, 4). Shape of penis in lateral and apical view is presented in figures 3 and 5, respectively.

♀ imago: Length of forewing 9 - 10 mm, colouration similar as in male, but lighter. Abdominal sternites light, cream - coloured. Egg valve as in fig.7.

Subimagines (extracted from nymph): Similar to imagines, wings uniformly dark grey with slightly lighter veins. ♂ genital structures not discernible from other members of the *Rh. semicolorata*-group.

Nymph (last instar): Dark brown without distinct pattern, dark tracheization clearly visible. Pronotum with transverse blackish stroke in middle. All femora dark brown with distinct, large, violet spot in middle of a narrow white field, tarsi distally darkened (fig.8), tarsal claws with 2 (-3) teeth. Abdominal sternites light with brown chitinized fold in posterior half, sternit (VIII) IX brown. Ganglionary chain whitish. Cerci in basal quarter whitish, then dark brown with light intersegmental areas. Gill I with sparsely crenulated

margin and rounded plica (fig.11), gills 2 - 7 with smooth borders. Gill 2 large, broadly rounded, gill 3 rhomboidal. Labrum and mandibles as in figures 14 an 15; the maxillary lacinia bears 7 - 9 combe shaped bristles, each with (6) 7 - 9 teeth. Spines from the central part of the dorsal surface of femora are shown in figure 16. Hind margin of abdominal tergites usually with slender teeth and without microdenticles.

Egg: Oblong shaped, dimension about 200 x 120 μm . Concentrated on one eggpole are large adhesive elements (KCT's sensu KOSS & EDMUNDS 1974, disc shaped sensu GAINO et al. 1989), around each of which pointed macrogranula are arranged in circles (fig.18). The surface of egg chorion is almost smooth and shows conical macrogranula disposed in irregular groups of (9) 12 - 17 elements each, surrounding dispersed KCT's of smaller size (fig.19). The typical pattern is already visible at a magnification of 400 x (fig.17). Usually there are two panshaped micropyles with slightly curved micropylar channel, the wall of the sperm - guide narrow with few microgranula (fig.20).

D i f f e r e n t i a l d i a g n o s i s : Imagines and nymphs are similar to *Rh. carpatoalpina* and *Rh. puytoraci*, discriminating characteristics for these closely related species are represented in table I. From the other hitherto described members of the *Rh. semicolorata*-group *Rh. taurisca* sp.n. differs in the following combination of characters: Wings almost transparent, outer apical tooth of penis not clearly visible from ventral side, penis apex in lateral view slightly rounded, nymphal gill 1 only sparsely crenulated marginally and with rounded plica, spines on surface of femora rather narrow, surface of egg with dispersed KCT's surrounded by irregular groups of macrogranula.

Penes treated with KOH usually become distorted; coverslip pressure also produces deformations and prevents exact determination.

D e r i v a t i o n o m i n i s : The new species has been named after the Taurisci, a Celtic tribe inhabiting the surroundings of the type locality in pre - Roman times.

E c o l o g y a n d d i s t r i b u t i o n : At present *Rh. taurisca* sp.n. is known only from the type locality, a small slightly acidic spring draining a swampy alpine pasture. Nymphs inhabit reaches of lower stream velocity at about 0,5m/s, most of them are infested with a chironomid parasite (? *Symbiocladius* sp.). They are associated with nymphs of *Rh. loyolaea* NAVAS, *Rh. alpestris* EATON (both in low numbers), *Ecdyonurus*

austriacus KIMMINS and *Baetis alpinus* PICTET. The new species represents the type of univoltine winterspecies (LANDA 1968), imagines occurring from end of July to September.

Acknowledgements

The author wishes to express his sincere gratitude to Mag. Dr. P. WEICHSELBAUMER (Innsbruck) for comparing some specimens with material from the original description of *Rh. carpatoalpina* and for his help in realizing the REM - photographs at the Limnological Institute (University Innsbruck). He is also indebted to Prof. Dr. P. ZWICK (Schlitz) and an anonymous referee for their valuable comments on an earlier version of the paper.

Zusammenfassung

Rh. taurisca sp.n., ein neuer Vertreter der *Rh. semicolorata*-Gruppe wird aus Österreich im Nymphen- und Imaginalstadium beschrieben. Locus typicus ist die Karner Alm im Nock-Gebiet (Salzburg). Die Imagines sind ähnlich *Rh. carpatoalpina*, lassen sich aber in Einzelheiten der Genitalstruktur und der Färbung unterscheiden. Merkmale zur Trennung von verwandten Arten werden tabellarisch für Ei-, Nymphen- und Imaginalstadium dargestellt. Besonders charakteristisch ist das Ei-Chorion, das eine einfache Abtrennung von den bisher beschriebenen Arten der *Rh. semicolorata*-Gruppe erlaubt.

References

- BELFIORE, C., 1987: Heptageniidae from Corsica and Sardinia. *Rhithrogena nuragica* sp.n., *Rh. eatoni* ESBEN-PETERSEN, 1912 and *Rh. insularis* ESBEN-PETERSEN, 1913 (Ephemeroptera). - Annls. Limnol. 23/2: 87-94.
- GAINO, E., M. MAZZINI, C. DEGRANGE & R. SOWA, 1989: Etude en microscopie à balayage des œufs de quelques espèces de *Rhithrogena EATON* groupe alpestris (Ephemeroptera, Heptageniidae). - Vie Milieu 39/3/4: 219-229.
- KLONOWSKA, M., M. OLECHOWSKA, M. SARTORI & P. WEICHSELBAUMER, 1987: *Rhithrogena carpatoalpina* sp.n., du groupe semicolorata, (Ephemeroptera, Heptageniidae) d'Europe central. - Bull. Soc. Vaud. Sci. Nat. 78/4: 445-454.

- KOSS, R.W. & G.F. EDMUNDS, 1974: Ephemeroptera eggs and their contribution to phylogenetic studies of the order. - Zool. J. Linn. Soc. 55: 267-349.
- LANDA, V., 1968: Developmental cycles of Central European Ephemeroptera and their interrelations. - Acta Entomol. Bohemoslov. 65: 276-284.
- NAVAS, J., 1905: Notas zoologicas. - Bol. Soc. Aragon. Cienc. Nat. 4/4-5: 17-18.
- SOWA, R., 1971: Sur la taxonomie de *Rhithrogena semicolorata* (CURTIS) et de quelques espèces voisines d'Europe continentale (Ephemeroptera: Heptageniidae). - Rev. Suisse Zool. 77: 895-920.
- 1984: Contribution à la connaissance des espèces Européennes des *Rhithrogena* EATON (Ephemeroptera, Heptageniidae) avec le rapport particulier aux espèces des Alpes et des Carpates. - Proc. 4th Int. Conf. Ephemeroptera, Bechyne 1983: 37-52. Czech. Acad. Sci. České Budějovice.
- & C. DEGRANGE, 1987: Sur quelques espèces Européennes de *Rhithrogena* de groupe *semicolorata* (Ephemeroptera, Heptageniidae). - Acta Hydrobiol. 24/4: 523-534.
- THOMAS, A.G.B., 1968: Quelques *Ecdyonurus* et *Rhithrogena* Européennes de la collection NAVAS (Ephemeroptera). - Annls. Limnol. 4/2: 209-218.
- & M. SARTORI, 1985: *Rhithrogena gorrizi* NAVAS, 1913 et *R. castellana* NAVAS, 1927: Redescription des images (Ephemeroptera, Heptageniidae). - Annls. Limnol. 21/1: 45-70.
- ZURWERRA, A., M. METZLER & I. TOMKA, 1987: Biochemical systematics and evolution of the European Heptageniidae (Ephemeroptera). - Arch. Hydrobiol. 109: 481-510.

Address of author: Dr. Ernst BAUERNFEIND
Naturhistorisches Museum Wien
I. Zool. Abt., Postf. 417
Burgring 7
A-1410 WIEN / Austria

	<i>Rh. taurisca</i> sp.n.	<i>Rh. carpatoalpina</i>	<i>Rh. puytoraci</i>	
Forewings	unicolourous	basal half brownish	basal half brown	
Vein C in forewing	dark brown	yellow	dark brown	IMAGINES
Crossveins in C-field	distinct	Indistinct	distinct	
Middle/hind femora	light olive	dark brown	yellowish grey	
Penis apex from side	truncated convex	concave	concave	
Inner apical tooth	ventrally invisible	visible	visible	IMAGO ♂
Penial vesicles	small	very large	large	
Combe shaped bristles	(6) 7-9 teeth	6-9 teeth	9-12 teeth	
Spot on femora	large, oblong	narrow, oblong	small, round	
Spines on femora	narrow to oval	shovel-shaped	shovel-shaped, short	NYMPHS
Gill I	sparsely crenulated	numerous incisions	numerous incisions	
Hindborder of tergites	without microdenticles	without microdenticles	with few microdenticles	
Ganglionary chain	not visible	not visible	spotted with violet	
Egg-chorion	(almost) smooth	densely granulated	densely granulated	
KCT's	scattered	in rows	in rows	EGGS
Macrogranula-circles	scattered	on one pole only	almost touching	
Spermguide-wall	narrow	broad	broad	
Range	1500-2000 m a.s.	400-1200 m a.s.	250-1200 m a.s.	

Table 1: Verification table for species identification

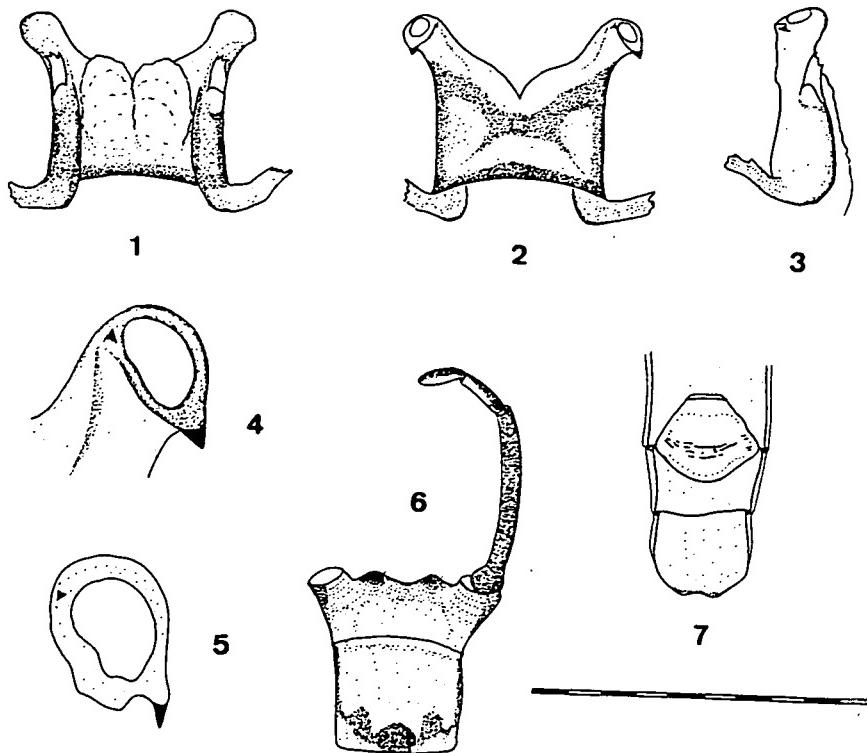
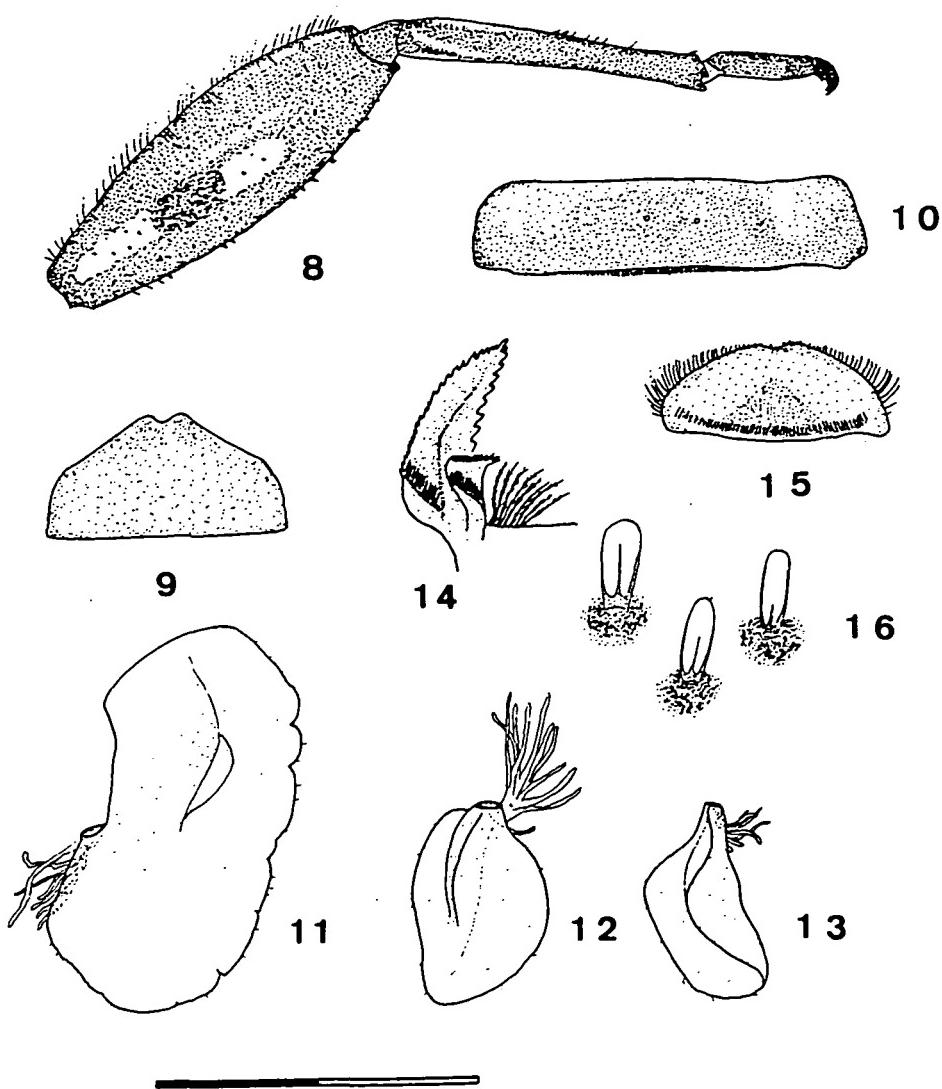


Fig. 1-7: *Rhithrogena taurisca* sp.n., imago; - 1) penis (ventral); - 2) penis (dorsal); 3) penis (lateral); 4) penis apex (dorsal); 5) penis apex (apical); 6) forceps base; 7) end of ♀ abdomen (ventral). Scaleline 1 - 3: 1 mm; 4 - 5: 0,35 mm; 6 - 7: 2 mm.



Figures 8 - 16: *Rhithrogena taurisca* sp.n., nymph.; - 8) hind leg; 9) anal plate; 10) abdominal tergit V; 11-13) gills 1, 3, 7; 14) mandibular incisors; 15) labrum; 16) spines from central area of hind femur. Scaleline 8 - 13: 2 mm, 14 - 16 individually more enlarged.

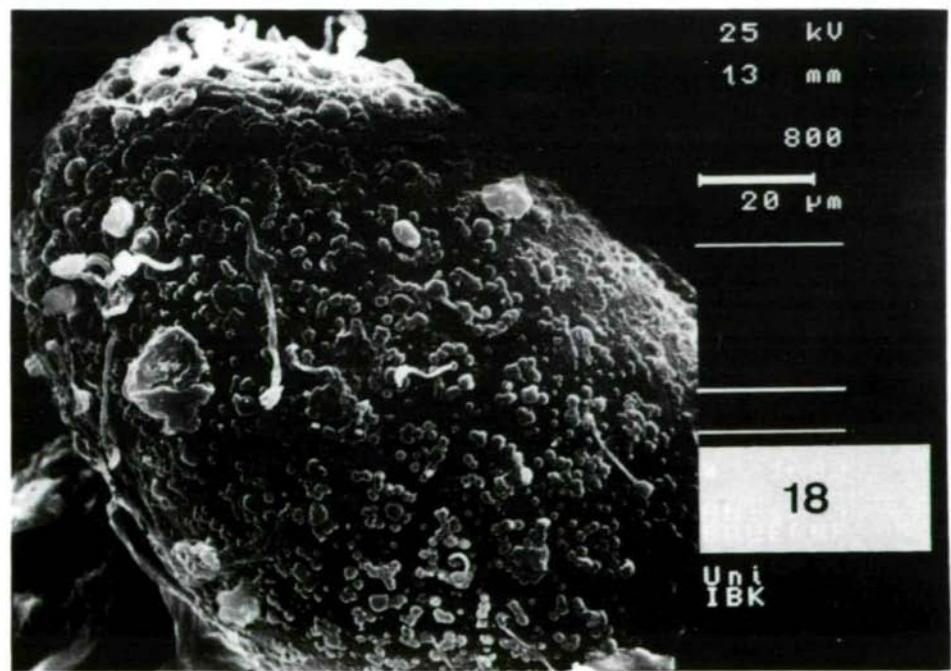
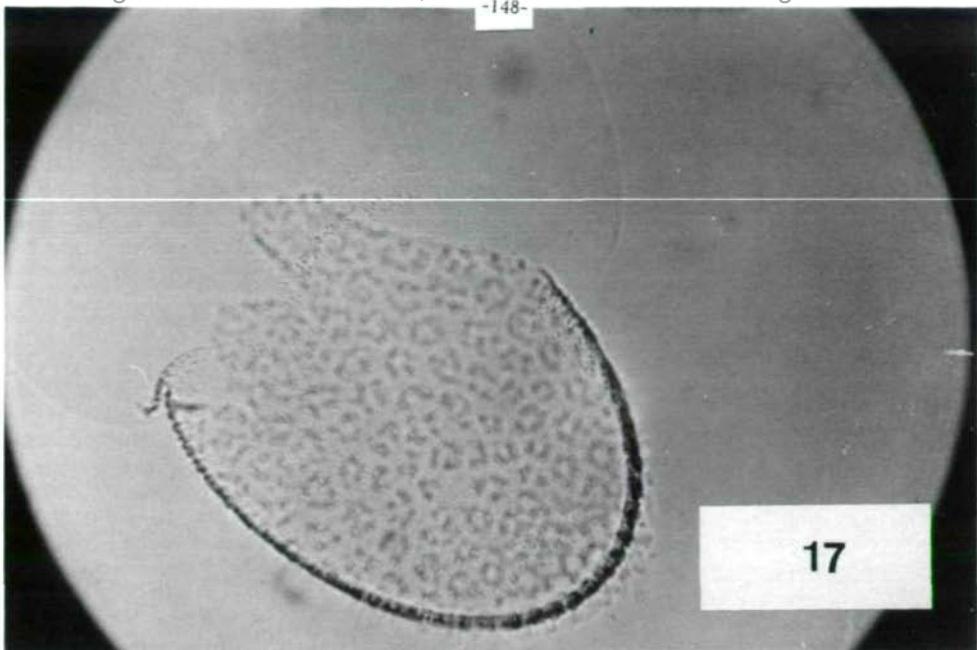


Fig. 17 - 18: *Rhithrogena taurisca* sp.n., chorionic structure of egg. - 17) empty eggshell, transmitted light, magnification 400x; - 18) egg - arrangement of adhesive structures on pole and surface, REM 800x.

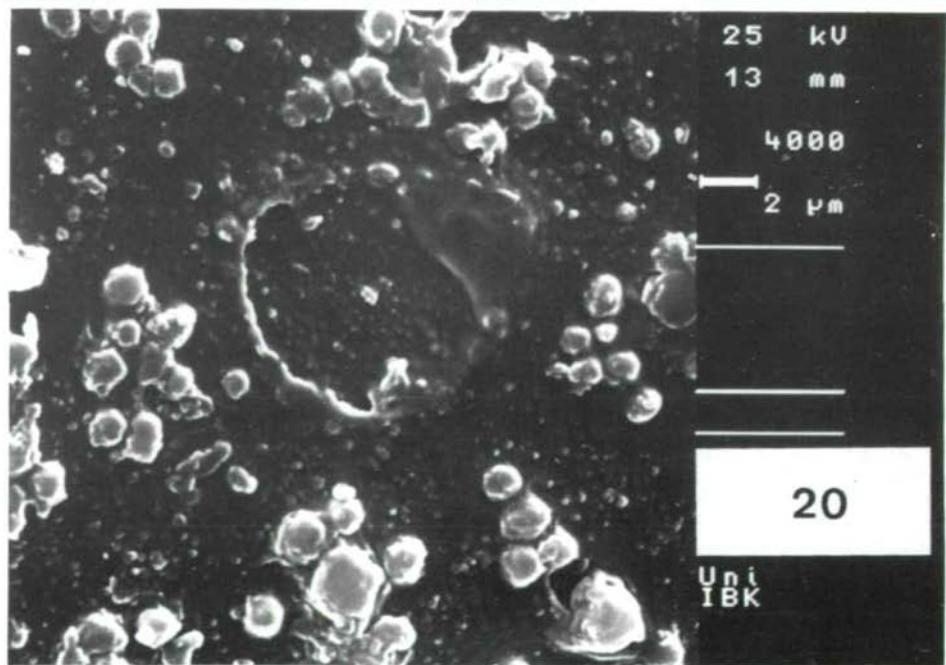
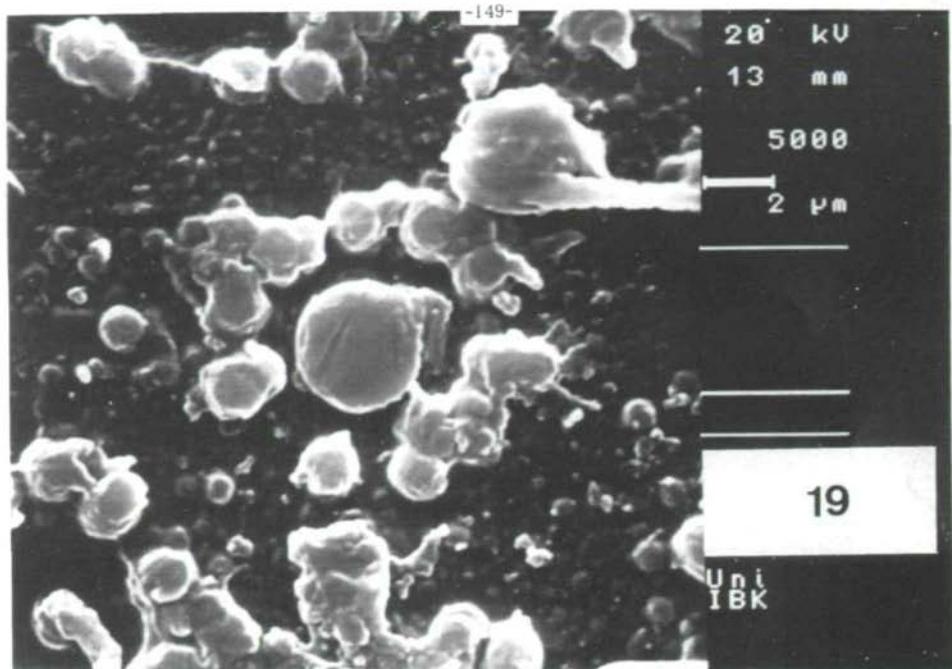


Fig. 19 - 20: *Rhithrogena taurisca* sp.n., chorionic structure of egg. -
19) egg surface - KCT encircled by macrogranula, REM 5000x; -
20) micropyle, REM 4000x.